Federal Energy Management Program

FEMP Designated Product: **Fluorescent Luminaires**

Leading by example, saving energy and taxpayer dollars in federal facilities

Purchasing Specifications for Energy-Efficient Products

Legal Authorities

Federal agencies are required by the Energy Policy Act of 2005 (P.L. 109-58) and Federal Acquisition Regulations (FAR) Subpart 23.2 to specify and buy ENERGY STAR®-qualified products or, in categories with no ENERGY STAR label, FEMP-designated products which are among the highest 25 percent of equivalent products for energy efficiency.

Performance Requirement for Federal Purchases

Luminaire Type (NEMA Designation)	Number of Lamps	Required LER (Instant-Start)	Required LER (Programmed-Start)
2' x 4' Recessed			
Lensed (FL)	2	74 or higher	69 or higher
	3	71 or higher	68 or higher
	4	68 or higher	63 or higher
VDT-preferred Louvered (FP)	2	61 or higher	56 or higher
	3	60 or higher	57 or higher
	4	60 or higher	57 or higher
Wraparound			
Four-Foot (FW)	2	71 or higher	66 or higher
	4	69 or higher	64 or higher
Strip			
Four-Foot (FS)	1	82 or higher	75 or higher
	2	77 or higher	71 or higher
2' x 2' Recessed with U-Tube Lamps			
VDT-preferred	2	50 or higher	46 or higher
Lensed	2	60 or higher	56 or higher

Buying Energy-Efficient Fluorescent Luminaires

When buying a fluorescent luminaire, specify or select a model with a Luminaire Efficacy Rating (LER) that meets or exceeds those shown in the *Performance Requirement* table.

Agencies must use ENERGY STAR-qualified and FEMP-designated performance requirements for all procurements of energy-consuming products and systems including guide and project specifications, and construction, renovation and service contracts. These performance requirements should also be used in evaluating responses to solicitations. In contracts and solicitations, agencies must specify that fluorescent luminaires meet or exceed the performance levels shown in the *Performance Requirement* table.

Agencies can claim an exception to these requirements through a written finding that no ENERGY STAR-qualified or FEMP-designated product is available to meet the functional requirements, or that no such product is life-cycle cost-effective for the specific application.

Calculating LER

LER data may not be available for some manufacturer's products. If an LER is not available, buyers may estimate the LER using this formula:

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LER = (Luminaire Efficiency x Total Rated Lamp Lumens x Ballast Factor) ÷ Luminaire Watts Input

Luminaire Efficiency, Total Rated Lamp Lumens, Ballast Factor, and Luminaire Watts Input may typically be found in manufacturers' product catalogs and photometric reports.

Buyer Tips

Lighting energy savings depend on good lighting design and controls as well as efficient luminaires. A lighting designer can assist with proper luminaire selection, placement, and choice of occupancy or daylighting controls.

Computer monitors, also known as video display terminals (VDTs), may be obscured by direct or reflected glare from overhead luminaires that emit light at wide angles. "VDT-preferred" luminaires meet IESNA recommendations for glare reduction (see *For More Information*). While reducing glare on computer screens, these luminaires may be less efficient than other luminaire types. Where greatly reduced glare is not a design need, look for either a VDT-compatible luminaire with a higher LER or an efficient non-VDT-rated model. Other special situations, such as equipment with high sensitivity to electromagnetic interference or the need for vandal-proof fixtures, may also compromise efficiency and require luminaires with lower LER.

Cost-Effectiveness Example
2' x 4' Recessed, Lensed (FL)

Performance	Base Model	Required Level (Instant-Start)	Required Level (Programmed-Start)
Luminaire Efficacy Rating (LER)	62	74	69
Mean Luminaire Light Output	3520 lumens	3500 lumens	3500 lumens
Power Input	60 watts	50 watts	54 watts
Annual Energy Use	216 kWh	179 kWh	193 kWh
Annual Energy Cost	$13	$11	$12
Lifetime Energy Cost	$137	$113	$122
Lifetime Energy Cost Savings	–	$24	$14

Cost-Effectiveness Assumptions

In the example, the Base Model uses two standard T8 lamps with standard electronic ballasts. The Required models use two high-performance T8 lamps with high-performance instant-start and programmed-start ballasts, respectively. For both examples, Lifetime Energy Cost is the sum of the discounted value of annual energy costs, based on 3,600 operating hours per year and an assumed luminaire life of 15 years. The assumed electricity price is 6¢ per kWh, the federal average electricity price in the U.S. Future electricity price trends and a discount rate of 3.0% are based on federal guidelines effective from April 2006 to March 2007.

Using the Cost-Effectiveness Table

In the example shown above, a fluorescent luminaire with an instant-start ballast meeting the required LER of 74 or higher is cost-effective if its purchase price is no more than $24 higher than an standard luminaire. A fluorescent luminaire with a programmed-start ballast meeting the required LER of 69 or higher will be cost-effective if its purchase price is no more than $14 higher than a standard luminaire.

What If My Energy Prices Or Operating Hours Are Different?

To calculate Lifetime Energy Cost Savings for a different electricity price, multiply the savings in the above table by this ratio: (*Your price in ¢/kWh*) ÷ (*6.0¢/kWh*). Similarly, for different hours of operation, multiply savings by this ratio: (*Your annual hours of use*) ÷ (*3,600 annual hours of use*).

For More Information:

EERE Information Center
1-877-EERE-INF or 1-877-337-3463
www.eere.energy.gov/femp/procurement/

Cyrus Nasseri, Project Manager
(202) 586-9138
Cyrus.Nasseri@ee.doe.gov

FEMP's *Federal Lighting Guide* and other resources provide guidance on lighting projects.
www.eere.energy.gov/femp/procurement/eep_lighting_guidance.html

National Electrical Manufacturers Association (NEMA) publishes Standards Publication LE5-2001, *Procedure for Determining Luminaire Efficacy Ratings for Fluorescent Luminaires.*
(800) 854-7179
www.nema.org

Consortium for Energy Efficiency (CEE) publishes specifications for high-performance T8 lamps and ballasts.
(617) 589-3949
www.cee1.org

Lighting Research Center publishes fluorescent lighting information.
(518) 276-8716
www.lrc.rpi.edu

Illuminating Engineering Society of North America (IESNA) publishes ANSI/IESNA RP-1-04, *American National Standard Practice for Office Lighting*, which includes recommendations for offices with VDTs.
(212) 248-5000
www.iesna.org

Lawrence Berkeley National Laboratory provided supporting analysis for this recommendation.
(202) 646-7954

A Strong Energy Portfolio for a Strong America

Energy efficiency and clean, renewable energy will mean a stronger economy, cleaner environment, and greater energy independence for America. Working with a wide array of state, community, industry, and university partners, the U.S. Department of Energy's Office of Energy Efficiency and Renewable Energy invests in a diverse portfolio of energy technologies.

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